

REMARKS

Status of the Application

Claims 1-34 were pending, and all were rejected in the Office Action mailed on December 13, 2007.

Rejections under 35 U.S.C. §102 and 103

Claims 10, 12, 16-17, 19-25, 29, and 31-34 were rejected under 35 U.S.C. §102(a) as allegedly being anticipated by U.S. Patent No. 6,476,511 to Yemm et al. ("Yemm"). Claims 13-15 and 26-28 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Yemm. Applicant respectfully requests reconsideration of these rejections.

Independent claims 1, 19, 31, and 32 are amended by the present amendment. Support for the amendments is found in the originally filed specification at least at page 17, lines 8-14. Applicant submits that no new matter is added.

Amended claims 1, 19, 31, and 32 are amended to clarify that each end of the linkage unit only allows rotation about one of the first and second axes of rotation and that these axes are mutually orthogonal. For example, amended claim 1 recites:

A wave power apparatus comprising:
a plurality of buoyant elongate body members, at least one adjacent pair of body members being interconnected by ***a linkage unit*** to form an articulated chain, each body member of said pair being connected to the respective linkage unit by linkage means permitting relative rotation of the body members;
power extraction means adapted to resist and extract power from the relative rotation, the power extraction means being located substantially within each linkage unit;
wherein ***each linkage unit*** is arranged to permit relative rotation between the linkage unit and a first body member about a ***first axis*** of rotation at ***only a first end of the linkage unit***, and to permit relative rotation between the linkage unit and a second body member about a ***second axis*** of rotation ***only at a second end of the linkage unit***;
wherein the ***first and second axes of rotation are mutually orthogonal***.

In one embodiment, as illustrated by, for example, Figs. 6 and 8a of the application, a linkage unit 30 connects adjacent body members, such as 6 and 8, together to form an articulated chain. Figs. 6 and 8a show the embodiment of the linkage unit to have a first end and a second end. The first end is the end of the linkage unit more proximate to body member 6. The second end of the linkage unit is the end of the linkage unit more proximate to body member 8. The linkage unit 30 is arranged as shown in Figs. 6 and 8a to permit relative rotation between the linkage unit 30 and a first body member 6 to be about a ***first axis*** of rotation. In this embodiment, the first axis of rotation is one about which pin 34 may rotate. Rotation about this first axis is ***only*** at the ***first end of the linkage unit***. Further, the linkage unit 30 is arranged to permit relative rotation between the linkage unit 30 and a second body member 8 about a ***second axis*** of rotation which is ***only*** at a ***second end of the linkage unit***. Furthermore, the first and the second axes of rotation are claimed to be ***mutually orthogonal***.

The Office Action alleges joint units 5 (5a and 5b) of Yemm describe the claimed linkage unit. As, discussed above, the independent claims have been amended to clarify the mutually orthogonal rotational axes features of the linkage unit. Yemm does not disclose at least these features. Yemm describes a floating apparatus and method for extracting power from sea waves structure 1 including segments 2 held together by joints 5. Each joint 5 of Yemm does not have a pair of mutually orthogonal axes of rotation where one axis of rotation is only available at one end of the linkage unit while the other end of the linkage unit has only available the rotation due to a second axis of rotation that is orthogonal to the first axis as recited in claims 1, 19, 31, and 32. Rather, each joint unit 5 of Yemm allows relative rotational movement between the joint unit and associated segment members 2 along only one axis (40) as seen in Fig. 3 of Yemm. This is different from claims 1, 19, 31, and 32 which generally recite “wherein each linkage unit is arranged to permit relative rotation between the linkage unit and a first body member about a first axis of rotation at ***only*** a first end of the linkage unit, and to permit relative rotation between the linkage unit and a second body member about a second axis of rotation ***only*** at a second end of the linkage unit; ***wherein the first and second axes of rotation are mutually orthogonal***.” The claimed linkage unit helps optimize power generation irrespective of the direction of the waves

relative to the power apparatus. On the other hand, due to the single axis of rotation described in Yemm, its apparatus can only generate electricity from waves approaching from a single direction. At least for the reasons discussed above, Yemm does not disclose each and every element of each of independent claims 1, 19, 31, and 32. Accordingly, claims 1, 19, 31, and 32, and claims dependent therefrom are not rendered obvious by Yemm. At least for similar reasons, claims 13-15 and 26-28 are not rendered obvious by Yemm.

Further remarks regarding patentability of claims 1-34 over reference listed in IDS, Ekstrom

Applicants have submitted herewith an Information Disclosure Statement listing U.S. Patent No. 4,408,965 (“Ekstrom”) as it was cited in an office action for a corresponding European application. Applicant submits that Ekstrom also does not describe the claimed mutually orthogonal axes features of the linkage unit as recited in each of the independent claims 1, 19, 31, and 32. Ekstrom describes a wave power turbine in which relative rotation is allowed at *each side* of a central barge unit about at least three axes of rotation (sway, rock, and pitch). (Ekstrom, col. 1, line 55 to col. 2, line 2.) Each *side* of the barge 12 allows for movement from the sway, rock, or pitch of the floats 14, 15 at each respective side of the barge 12. (Ekstrom, Fig. 2, cables 30, 31, 32, and 34.) Every axes of rotation available to one end of the barge 12 is available to the other end of the barge 12, so that Ekstrom does not disclose “a linkage unit [that] is arranged to permit relative rotation between the linkage unit and a first body member about a first axis of rotation at **only** a first end of the linkage unit, and to permit relative rotation between the linkage unit and a second body member about a second axis of rotation **only** at a second end of the linkage unit; **wherein the first and second axes of rotation are mutually orthogonal**,” as claimed. Rather, the turbine apparatus of Ekstrom has the problem that much relative movement between the floats 14, 15 and the barge 12 is not converted into useful power. The present invention overcomes this problem by limiting the rotation at each end of the linkage unit to only rotate about a single axis of rotation. Thus, the present invention ensures that this single mode of relative rotation can efficiently extract power by the power extraction means. As highlighted above, by arranging these single axes of rotation so that they are orthogonal, the present invention is able to

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extract energy efficiently from waves coming from multiple directions. At least for these reasons, claims 1-34 are also patentable over Ekstrom.

Conclusion

Applicant believes the pending application is in condition for allowance. If there is any matter that the Examiner would like to discuss, he or she is invited to contact the undersigned representative at the telephone number set forth below.

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Respectfully submitted,

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